WARTIME PRODUCTION OF DRY BEANS
In Selected Areas
of
The Northern Plains

Bureau of Agricultural Economics
United States Department of Agriculture
Lincoln, Nebraska
March 1944

SUMMARY

In response to wartime demands, the dry edible bean acreage in the Northern Great Plains was expanded greatly in 1943. The expansion occurred in established bean-producing areas, both irrigated and dry-land, as well as in new dry-land areas. Unusually dry weather, lack of experience in growing beans, and a shortage of machinery properly to handle the crop resulted in disappointing returns generally for inexperienced growers in the new areas. Experienced growers in the established areas had satisfactory returns from beans. Most of the beans produced graded No. 1 because of favorable weather conditions at harvest time.

Beans tend to compete mainly with corn, feed crops and fallow for the use of cropland in the dry-land areas, with wheat having first call on the land. Beans are sometimes grown as a catch crop for corn or may be planted on abandoned wheat land. Major problems in fitting beans into the farming system in the dry-land areas are control of soil blowing following bean harvest and increased labor requirements for beans as compared with other crops. On western Nebraska irrigated farms an expansion in bean acreage has occurred largely at the expense of sugar beets and corn. Farmers have little difficulty in fitting beans into the rotation on these farms.

Prospective returns and opinions expressed by farmers interviewed indicate that production of beans in 1944 will be at least maintained at the 1943 level in the western Nebraska irrigated area. Probably it will be reduced somewhat in the established dry-land area of Colorado unless RACC production loans or some other form of risk insurance are provided. The study indicated that farmers in the new dry-land bean areas will reduce their acreage in 1944. Prospective returns from beans are about equal to corn in the established dry-land area. They are less than those from sugar beets and potatoes in the irrigated area but considerations other than returns per acre are extremely important as farmers weigh the advantages and disadvantages of producing beans.

The production of beans has been increased in the irrigated area because the crop requires much less labor than beets or potatoes. A partial substitution of beans for beets on farms with beets and potatoes in the rotation gives a better seasonal distribution of labor. On some farms this made it possible to do a larger proportion of the work with operator and family labor. Beans have the additional advantage of being a cash crop with a relatively low investment risk and relatively low management requirements. Many farmers had sufficient labor in sight to produce beans, whereas considerable time and effort was required in obtaining and supervising labor for the production of sugar beets and potatoes. This has become increasingly important during the wartime emergency as labor uncertainties have increased and the quality of labor declined. It has increased the danger of loss from intensive, high-cost crops and farmers have been willing to forego some cash income in order to reduce the risk and the effort required to produce such crops.

SUMMARY

In response to certain demands, the city which had acreage in the Yorkton Grant District was expanded greatly in 1953. The expansion consisted in establishing beam-pumping areas, both irrigated and dry-land, as well as in new dry-land areas. Availability of machinery, lack of experience in growing beans, and a shortage of machinery generally, to handle the crop resulted in disappointing returns generally for farmers assisted through the new areas. Expanded demand growers in the established areas had satisfactory returns from beans. Most of the beans produced during 1953 consisted of favorable weather conditions at harvest time.

Farmers based on returns mainly with corn, flax crops and fallow for the use of cropland in the dry-land areas, with wheat having first call on the land. There are economical grains as a cash crop for corn or may be planted on cleaned wheat land. Major problems in getting beans into the farming system in the dry-land areas are control of soil blowing, fallowing land because and increased labor requirements for beans as compared with other crops. On western Saskatchewan farms an expansion in bean acreage has occurred largely at the expense of sugar beets and corn. Farmers have little activity in fitting beans into the rotation on these farms.

Prospective returns and opinions expressed by farmers interviewed indicate that production of beans in 1954 will be at least maintained at the 1953 level in the western Saskatchewan irrigated area. Probably it will be reduced somewhat in the established dry-land area of Saskatchewan unless PFAC production loans or some other form of risk insurance are provided. The study indicated that farmers in the new dry-land beans areas will reduce their acreage in 1954. Prospective returns from beans are about equal to corn in the established dry-land area. They are less than from sugar beets and potatoes in the irrigated area but are considerably higher than returns for oats are extremely important as farmers weigh the advantages and disadvantages of producing beans.

The production of beans has been increased in the irrigated area because the crop requires much less labor than beets or potatoes. A partial consideration of beans for hauls on farms with beets and potatoes is the possibility of a better seasonal distribution of labor. In some farms this made it possible to do a larger proportion of the work with operator and family labor. Beans have the additional advantage of being a cash crop with a relatively low investment risk and relatively low management requirements. Many farmers had sufficient labor in excess to production needs, whereas considerable time and effort was required in obtaining and supervising labor for the production of sugar beets and potatoes. This has become increasingly important during the wartime emergency as labor unavailability has increased and the quality of labor deteriorated. It has lessened the danger of loss from harvesting difficulties. In the dry-land areas farmers have been willing to invest some cash outlay in order to reduce the risk and the effort required to produce such crops.

Experiences gained in 1943 make possible a better analysis of production opportunities in allocating 1944 bean goals to counties and to individual farms. Greater emphasis needs to be placed in 1944 on getting beans produced rather than getting a larger acreage planted. Inexperienced growers should not be encouraged to plant a large acreage the first year. The availability of family labor for hoeing should also be considered in allocating bean goals to individual farms. Beans fit best into a diversified farming system and on farms equipped with row-crop machinery. Best results can be expected on a medium-textured soil. Farmers who feel that beans are not well adapted to their particular farms and who, therefore, are not willing to put sufficient effort into growing the crop should not be influenced to plant beans for patriotic reasons.

Experienced growers (on both dry-land and irrigated farms) have come to recognize certain general practices as conducive to the successful production of beans. A good seedbed should be prepared and as many of the weeds killed as possible before planting time. Planting of certified seed when it is available is recommended as an aid to controlling blight. If blight is evident, beans should not be cultivated when wet with dew or rain. Harrowing or "blind" cultivating before the beans come up helps in controlling weeds. When necessary, beans should be hoed to control weeds but, to avoid excessive costs, the amount of hoeing should be kept to a minimum by adequate seedbed preparation and timeliness of cultivation. Weeds not only lower yields but make the crop difficult to harvest. The beans should be "laid by" with the soil "thrown in" well around the vines, otherwise mechanical pullers will not operate satisfactorily. To avoid excessive shattering the beans should be harvested before they become too ripe and should be windrowed or piled soon after pulling. Danger of loss due to wind shattering or rain is greater when the beans are cured in the windrow and threshed with a pick-up combine than when they are threshed from piles in the field or from stacks. Combining from the windrow, however, saves labor. Unless moisture is available to plant a fall grain crop, most bean land must be furrowed to control blowing during the winter months. In certain areas, strip cropping is necessary to control soil blowing, especially on lighter soils.

To bring about more general adoption of good cultural practices calls for a more intensive educational program another year, especially in new bean areas. Increased allotments of new machinery, especially side-delivery rakes, would also be an encouragement to production of beans. In some areas more convenient marketing facilities need to be made available. A continuation of RACC production loans which insure farmers against complete loss in the event of a bean failure, or some other form of insurance, is needed if acreage of beans is to be maintained in the established dry-land area.

Experiments going on in 1963 make possible a better analysis of production opportunities in allocating that bean goals to counties and to individual farms. Further emphasis needs to be placed in 1964 on getting beans produced rather than getting a larger acreage planted. Increased yields should not be encouraged to plant a large acreage the first year. The availability of family labor for hoeing should also be considered in allocating bean goals to individual farms. Beans fit best into a diversified farming system and on farms equipped with row-crop machinery. Best results can be expected on a medium-textured soil. Farmers who find that beans are not well adapted to their particular farms and who, therefore, are not willing to put sufficient effort into growing the crop should not be interested in plant beans for patriotic reasons.

Experienced growers (on both dry-land and irrigated farms) become to recognize certain general practices as conducive to the successful production of beans. A good seedbed should be prepared and as many of the weeds killed as possible before planting time. Planting of certified seed when it is available is recommended as an aid to controlling blight. If blight is evident, beans should not be cultivated when wet with dew or rain. Harvesting or "windrowing" cutting beans some days in advance of threshing weeds. When necessary, beans should be hoed to control weeds but, to avoid excessive costs, the amount of hoeing should be kept to a minimum by adequate seedbed preparation and timeliness of cultivation. Weeds not only lower yields but make the crop difficult to harvest. The beans should be "laid by" with the soil "thrown in" well around the vines, otherwise mechanical pulling will not operate satisfactorily. To avoid excessive shattering the beans should be harvested before they become too ripe and should be windrowed or piled soon after pulling. Danger of loss due to wind shattering or rain is greater when the beans are stored in the windrow and threshed with a pickup combine than when they are threshed from piles in the field or from stacks. Combining from the windrow, however, saves labor. Unless moisture is available to plant a fall grain crop, most bean land must be protected by contour blowing during the winter months. In certain areas, strip cropping is necessary to control soil blowing, especially on lighter soils.

In bringing about more general adoption of good cultural practices calls for a more intensive educational program during the year, especially in new bean areas. Increased acreages of new machinery, especially pick-delivery rakes, would also be in accordance to production of beans. In some areas more control of marketing facilities need to be made available. A continuation of PACC production loans which insure farmers against complete loss in the event of a bean failure, or some other form of insurance, is needed if acreage of beans is to be maintained in the established dry-land area.

WARTIME PRODUCTION OF DRY BEANS IN SELECTED AREAS OF THE NORTHERN PLAINS

By
Raymond B. Hile, Assistant Agricultural Economist
and
Ned O. Thompson, Associate Agricultural Economist 1/

Contents

PRELIMINARY

Demand for dry edible beans as an important wartime food crop brought about an increase in planting of 78 percent over 1942 acreages in the seven Northern Plains States in 1943. Beans were not a new crop in most areas where the expansion occurred, but many farmers grew them for the first time in 1943. As a result of inexperience and unfavorable weather conditions most reports coming from the bean areas indicated considerable dissatisfaction with the crop under dry-land conditions. In the irrigated areas the problem was apparently competition between beans and other food crops, especially potatoes and sugar beets, for the use of land. Difficulties encountered by bean growers in 1943 are significant in relation to maintenance of a high level of bean production in the future.

1/ The authors shared equal responsibility in making the study. Valuable criticism and suggestions were received from T. S. Thorfinnson and D. C. Myrick of the Bureau of Agricultural Economics and from Frank Miller, Nebraska Agricultural Experiment Station. The Extension Service of Nebraska and the Colorado Agricultural Experiment Station assisted in selecting study areas. Within each county the farmers interviewed were selected with the assistance of the county agricultural agent and the county AAA office. The Nebraska Agricultural Experiment Station furnished the basic data from which tractor power and machinery costs were calculated. The manuscript was reviewed by members of the Colorado, Wyoming, and Montana Agricultural Experiment Stations.

PRACTICES PRODUCTION OF DRY BEANS IN SELECTED AREAS OF THE NORTHERN PLAINS

By

Raymond D. Rice, Assistant Agricultural Economist

and

Ned O. Thompson, Associate Agricultural Economist 1/

Contents

PRELIMINARY

Demand for dry edible beans as an important meatless food crop brought about an increase in planting of 74 percent over 1942 acreages in the seven Northern Plains States in 1943. Beans were not a new crop in most areas where the expansion occurred, but many farmers grew them for the first time in 1943. As a result of inexperience and unfavorable weather conditions most reports coming from the bean areas indicated considerable dissatisfaction with the crop under dry-land conditions. In the irrigated areas the problem was apparently competition between beans and other food crops, especially potatoes and sugar beets, for the use of land. Difficulties encountered by bean growers in 1943 are significant in relation to maintenance of a high level of bean production in the future.

1/ The authors shared equal responsibility in making the study. Valuable criticisms and suggestions were received from T. S. Morrison and D. C. Wright of the Bureau of Agricultural Economics and from Frank Miller, Nebraska Agricultural Experiment Station. The Extension Service of Nebraska and the Colorado Agricultural Experiment Station assisted in selecting study areas. Within each county the farms interviewed were selected with the assistance of the county agricultural agent and the county AAA office. The Nebraska Agricultural Experiment Station furnished the basic data from which tractor power and machinery costs were calculated. The manuscript was reviewed by members of the Colorado, Wyoming, and Nebraska Agricultural Experiment Stations.

As the national need for beans continues high in 1944, answers to the following questions seem pertinent: (1) What difficulties did bean growers encounter in 1943, especially new growers, under dry-land and irrigated conditions? (2) What are the most desirable practices used in growing beans under dry-land and irrigated conditions? (3) To what extent can beans be substituted for other crops and what is the competitive position of beans with other crops from a cost and return standpoint? (4) What is needed to encourage production of beans in 1944?

Areas Studied

Information relative to the production and marketing of beans in 1943 was obtained from 51 dry-land bean growers in Box Butte and Chase Counties, Nebraska, and Arapahoe and Elbert Counties, Colorado. Nineteen growers farming irrigated land were interviewed in Scotts Bluff County, Nebraska. Altogether, schedules were obtained from 70 growers.

Practically all of the beans grown in Box Butte and Scotts Bluff Counties were of the Great Northern variety, whereas in Chase County and the two Colorado counties the Pinto variety was grown almost exclusively.

The farmers interviewed in Scotts Bluff County were experienced bean growers; however, most of them were growing more beans than thay had previously grown. From 1931 to 1941, an average of 8,200 acres of beans were harvested in Scotts Bluff County. Most of these were produced on irrigated farms. The harvested acreage increased to 21,000 acres in 1942 and around 40,000 acres in 1943. This acreage was rather uniformly distributed throughout the irrigated area. An average of 32 acres of beans per farm was grown in 1943 on farms covered in the survey. This represented 19 percent of the irrigated land on these farms (table 1).

The Colorado counties were selected to represent a well-established dry-land bean-growing area. As much as 85,000 acres of beans were harvested in these counties in 1930, but the acreage decreased during the drought years and was down to 27,000 acres in 1941. Most of the farmers interviewed in this area were experienced bean growers and had acreages above average. Seventy-five percent of them had 50 acres or more of beans in 1943 (table 1).

Box Butte County has been generally considered representative of that portion of western Nebraska where an expansion of bean production under wartime conditions seems most feasible. However, beans had not been grown here in any significant quantity under dry-land conditions before 1943. The average acreage of beans harvested in Box Butte County from 1931 to 1941 was only 240 acres, whereas about 2,000 acres were planted in 1943 on dry land. This acreage was divided among 141 growers scattered throughout the farming areas, but was somewhat concentrated in the vicinity of Alliance. The majority of the growers had small

As the national need for beans continues high in 1944, answers to the following questions seem pertinent: (1) What difficulties did bean growers encounter in 1943, especially new growers, under dry-land and irrigated conditions? (2) What are the most desirable practices used in growing beans under dry-land and irrigated conditions? (3) To what extent can beans be substituted for other crops and what is the comparative position of beans with other crops from a cost and return standpoint? (4) What is needed to encourage production of beans in 1944?

Areas Studied

Information relative to the production and marketing of beans in 1943 was obtained from 81 dry-land growers in Box Butte and Dawes Counties, Nebraska, and Arapahoe and Elbert Counties, Colorado. Nine bean growers farming irrigated land were interviewed in Scotts Bluff County, Nebraska. Altogether, schedules were obtained from 70 growers.

Practically all of the beans grown in Box Butte and Scotts Bluff Counties were of the Great Northern variety, whereas in Dawes County and the two Colorado counties the Pinto variety was grown almost exclusively.

The farmers interviewed in Scotts Bluff County were experienced bean growers; however, most of them were growing more beans than they had previously grown. From 1931 to 1941, an average of 8,300 acres of beans were harvested in Scotts Bluff County. Most of these were produced on irrigated farms. The harvested acreage increased to 21,000 acres in 1942 and around 40,000 acres in 1943. This acreage was rather uniformly distributed throughout the irrigated area. An average of 32 acres of beans per farm was grown in 1943 on farms covered in the survey. This represented 19 percent of the irrigated land on these farms (table 3).

The Colorado counties were selected to represent a well-established dry-land bean-growing area. As much as 85,000 acres of beans were harvested in these counties in 1930, but the acreage decreased during the drought years and was down to 27,000 acres in 1941. Most of the farmers interviewed in this area were experienced bean growers and had acreages above average. Seventy-five percent of them had 80 acres or more of beans in 1943 (table 1).

Box Butte County has been generally considered representative of that portion of western Nebraska where an expansion of bean production under wartime conditions seems most feasible. However, beans had not been grown here in any significant quantity under dry-land conditions before 1943. The average acreage of beans harvested in Box Butte County from 1931 to 1941 was only 240 acres, whereas about 2,000 acres were planted in 1942 on dry land. This acreage was divided among 141 growers scattered throughout the farming area, but was somewhat concentrated in the vicinity of Alliance. The majority of the growers had small

acreages. Fifty percent had less than 10 acres per farm, 42 percent had 10 to 29 acres, and only 8 percent had 30 or more acres 2/. The average was 13 acres. The growers interviewed had acreages above the average in the county: the average acreage of beans on the 19 farms studied was 38 acres per farm. Only 17 percent had less than 10 acres per farm (table 1). Most of the farmers interviewed had little, if any, recent experience in growing beans, although a few had grown them in the early twenties.

Chase County, Nebraska, was selected as representing a less favorable dry-land bean-growing area, as it is located in the eastern fringe of the area considered suitable for bean production in wartime. Only two farmers in the county had consistently grown beans for the last 10 years or more. An average of less than 100 acres was harvested from 1931 to 1941 and not much more than that in 1942. In 1943, about 2,100 acres of beans were planted on 142 farms located mainly in the west-central part of the county and in the area south of Champion.2/. Seventy-two percent of these growers had less than 10 acres per farm. Seventeen percent had from 10 to 29 and only 11 percent had 30 or more acres. The average was 14 acres. Most of the farmers interviewed had no previous experience in growing the crop. The average acreage of beans on these farms was 32 acres (above the average for the county). Forty-two percent had less than 10 acres per farm (table 1). In both Chase and Box Butte Counties less than 10 percent of the cropland on the selected farms was planted to beans.

Table 1.- Acreage of dry edible beans on sample farms in selected areas in the Northern Great Plains, 1943

Areas	Number of farms	Average acres beans per farm	Average percent crop-land in beans	Proportion of growers having: 9 acres or less	10-29 acres	30-49 acres	50 acres & over
				Pct.	Pct.	Pct.	Pct.
Colorado area 1/	20	110	21	---	---	25	75
Nebraska areas:							
Box Butte County	19	38	7	17	50	11	22
Chase County	12	32	9	42	25	25	8
Scotts Bluff County	19	32	19	5	58	21	16

1/ Includes Arapahoe and Elbert Counties.

From a climatic standpoint there appears to be little reason why the yield of beans should not be as high in western Nebraska as it was in the established dry-land bean area of Colorado. Higher summer temperatures might be more of a limiting factor in Chase County (table 2).

2/ Based on acreage goals which tend to be smaller than actual acreage planted.

Table 2.- Average climatic conditions of the selected dry-land bean areas 1/

Item	Arapahoe Co., Colorado	Elbert Co., Colorado	Box Butte Co., Nebraska	Chase Co., Nebraska
Annual rainfall	13-15 in.	15-17 in.	16-18 in.	20-23 in.
Frost-free period (days)	140-160	120-160	140-160	160
Mean temp. (June to Aug.) (degrees)	65 - 70	65 - 70	65 - 70	70 - 75
Elevation (feet)	5,000-6,000		4,000-5,000	3,500-4,000

1/ The figures given represent the range within the county on a long-time average basis.

DIFFICULTIES ENCOUNTERED IN 1943

The principal difficulties encountered in the dry-land areas in producing beans in 1943 were lack of experience; dry, hot weather; shortage of hand labor for hoeing; obtaining a stand; distance to market; lack of adapted machinery; shattering; hail; and soil erosion following beans. In the Scotts Bluff irrigated area shortage of hand labor for hoeing, frost damage, poorly adapted seed, blight, and loss from shattering were the major problems. Difficulties in the Scotts Bluff irrigated area were relatively minor in their influence on yield of beans as compared with the dry-land areas. The Mexican bean beetle is a serious pest in some irrigated areas, but no damage was reported in Scotts Bluff County.

Dry-land Areas

Lack of experience: Beans were a new crop to a majority of growers in Box Butte and Chase Counties. Although difficult to measure, lack of adequate knowledge of bean culture was cited as a serious obstacle in these counties. Some effects associated with lack of experience were higher costs of production, difficulty in obtaining a stand, poorer weed control and loss from shattering. In the Colorado area, where farmers have been growing beans as a major crop for many years, less difficulty was experienced in growing and harvesting the crop.

Dry, hot weather: The 1943 season was unfavorable for production of beans in the dry-land areas that were studied. A lack of midseason moisture and hot weather at blooming time seriously reduced the yield. The bean crop was produced largely on moisture received before July 1. Hot weather at blooming time resulted in blighting of blossoms two and three times before beans finally set. This difficulty was particularly serious in Chase County where 11 of 12 farmers interviewed reported reduced yields due to shedding of blossoms. In Box Butte County 9 of 19 and in Colorado 11 of 20 farmers reported dry weather as the main reason for low yields.

Hand labor for hoeing: Shortage of labor for hoeing was particularly bothersome on farms with relatively large acreages of beans and on which family labor was not available for this type of work. Because dry-land farmers in the newer bean areas were not accustomed to hoeing field crops the magnitude of the job and need for adequate labor was not fully appreciated at planting time. Thirteen of 31 growers interviewed in Chase and Box Butte Counties indicated a shortage of labor for hoeing. In the Colorado area, only 3 of 20 growers reported a similar difficulty.

Obtaining a stand: Washing and crusting of the topsoil because of heavy rains after planting prevented the plants from coming through the ground and was the major cause of poor stands in 1943. This was particularly significant in Box Butte and Chase Counties where 6 of 31 growers reported such difficulty. Only one grower in the Colorado area reported a poor stand.

A number of growers reported poor stands because corn planter plates were used for planting beans. The usual result was that not enough seed per acre was planted. In Box Butte and Chase Counties the rate of seeding, as reported by the farmers, ranged from 8 to 19 pounds and averaged 12.9 pounds per acre. The rate of seeding in the Colorado area varied from 10 to 20 pounds and averaged 13.5 pounds per acre (table 3).

Table 3.- Quantity of bean seed planted per acre in the selected dry-land areas, 1943

Pounds per acre	Box Butte County, Nebraska		Chase County, Nebraska		Arapahoe and Elbert Counties, Colorado	
	Number of growers	Percent	Number of growers	Percent	Number of growers	Percent
8 - 10	0	0	1	8	0	0
10 - 12	4	26	4	33	3	15
12 - 14	3	20	3	25	7	35
14 - 16	6	40	2	17	7	35
16 - 18	1	7	2	17	2	10
18 - 20	1	7	0	0	0	0
20 and over	0	0	0	0	1	5
Total	15	100	12	100	20	100

Marketing: Marketing was a problem in those areas in which local elevators were not equipped to handle beans. Farmers in Box Butte County were obliged to haul to towns in the Platte River valley, a round-trip distance of from 75 to 120 miles. Chase County beans were marketed in Sterling, Colorado, a round trip of from 100 to 150 miles for most

farmers. The Colorado area had no marketing problem as practically all elevators in the area have facilities for handling beans.

Five of the 12 farmers in Chase and 3 of the 19 farmers in Box Butte County reported marketing as a problem. This situation was known at the beginning of the season, therefore it was accepted with a minimum of complaint. The beans produced on most farms could usually be hauled in one trip and often a special trip was unnecessary.

Machinery: The machine difficulty was most pronounced in the Nebraska areas where many farmers grew beans for the first time in 1943. Six of the 19 growers interviewed in Box Butte and 3 of 12 in Chase County reported some difficulty. Inadequate harvesting machinery gave the greatest trouble, chiefly because the acreage of beans on these farms would not warrant the purchase of a regular bean cutter and pick-up attachments for combines. Most other operations on the crop could either be performed with other row-crop machinery or custom hired. Also, many of these farmers considered beans a temporary crop and would normally have no need for specialized bean machinery. Unfamiliarity with harvesting methods was also a factor.

Shattering: Ten percent of the operators in the established bean area in Colorado reported shattering, as compared with 23 percent of the growers in Box Butte and Chase Counties. Shattering occurred when beans were allowed to over-ripen before harvesting and when vines were badly rolled by wind while in windrows or when handled while dry and brittle.

Hail: Approximately one-third of the farmers interviewed in Box Butte County, 42 percent in Chase County, and 5 percent in the Colorado area, reported damage from hail in 1943. A number of farmers in Chase County suffered almost complete loss; however, the damage was slight in most other areas.

Soil erosion: Although, by November of 1943, few farmers had reported damage to bean land from erosion, practically all recognized the danger during the coming winter months. Land from which beans are harvested is left exposed and is finely pulverized.

Irrigated Area

Hoeing labor: Approximately one-third of 19 farmers interviewed reported a shortage of labor to hoe the bean crop. The actual effect of this difficulty on yield is not available, but was probably slight as yields were generally above average. In addition, the shortage will have little or no influence upon the attitude of growers toward planting beans another year, because competitive crops (sugar beets and potatoes) require more hand labor than do beans.

Frost: An early frost, about September 8, did some damage to late bean fields that were replanted or planted later than the recommended date of about June 15. A number of farmers reported some reduction in size of beans, but not sufficient to lower the grade below No. 1.

Seed: Of the 19 growers interviewed, two reported poor germination and two variety difficulties.

Because the University of Idaho No. 123 Great Northern variety was not available in sufficient quantities, U.I. No. 15 G. N. was substituted. It is a later maturing variety than U. I. No. 123, and also produces larger vines which extend into the area between the rows. This results in more shattering at harvest time from machinery wheels passing over the beans.

Blight: Three of 19 farmers reported some blight damage in 1943. Blight is recognized as a constant threat to the bean crop, so all possible precautions are taken. Most farmers plant a certified disease-free seed. Another precaution taken to help control spread of the disease is to avoid working in the bean field when the plants are wet from rain or dew.

The relative importance of the difficulties is presented in table 4.

Table 4.- The percentage of farmers reporting various difficulties in producing dry edible beans in 1943, by areas

Item	Dry-land areas				Irrigated area
	Box Butte County (19 farms)	Chase County (12 farms)	Arapahoe and Elbert Counties (20 farms)	Total (51 farms)	Scotts Bluff County (19 farms)
	Percent	Percent	Percent	Percent	Percent
Dry, hot weather	47	92	55	62	0
Labor for hoeing	40	42	15	31	32
Obtaining a stand	32	25	5	20	0
Distance to market	16	42	0	16	0
Lack of adapted machinery	32	25	15	24	5
Shattering	21	25	10	18	11
Hail	32	25	5	20	5
Soil erosion	5	8	0	4	5
Frost	11	0	10	8	32
Seed	0	0	0	0	21
Blight	0	0	10	4	16

PRACTICES IN GROWING BEANS

Irrigated Area

On the 19 irrigated farms in Scotts Bluff County the preparation of a seedbed for beans in 1943 differed very little from the land preparation work for planting beets, potatoes, or other row crops. In nearly every case the land was plowed in April or May with a moldboard plow. Often a two-way moldboard plow was used. On about one-fourth of the farms the land was disked before plowing. A tandem disk (7- to 8-foot) is most common in the area. The land was usually harrowed (spike-tooth) from one to three times and floated (wood float) once or twice after plowing and before planting. On a few farms the land was also covered with a roller or disked before planting.

Application of manure to bean land was not a common practice, however, beans respond well to moderate applications of manure in this area. The use of more than about 10 tons per acre is not considered desirable because of excessive vine growth which reduces the yield.

Mainly four-row but a few six-row beet and bean planters that normally space the rows 20 inches apart were used. About half the farmers used horse-power for planting. The range in planting rate was from 45 to 60 pounds of seed to the acre and averaged 56 pounds, including a small amount of replanting. It was a common practice to ridge the dirt over the row with a cultivator after planting, irrigate, then harrow down the ridges before plants emerged. Planting dates ranged from May 20 to June 20.

The beans were cultivated an average of four times, but the primary purpose of one or more of these cultivations was to furrow the rows for irrigating. Most farmers used four-row cultivators, but a few used six-row machines. Tractor power was used for practically all machine operations, although five of the growers used horse power for cultivating.

The beans were irrigated an average of four times. The range in number of irrigations was from two to seven. An average of 7 1/3 hours of labor per acre was used in applying water. Most of the water was applied during July and August. On all but two of the farms the beans were hoed at least once. About 5 hours of labor per acre were used for hoeing. Most of the hoeing was hired, whereas a larger portion of the irrigating was done by the operator or by family labor.

The beans were harvested with four or six-row pullers, that leave the vines in two or three windrows back of the machine. Most of these were specialized machines, but a few were made locally by attaching blades to cultivators in place of shovels. On one-third of the farms the beans were harvested on a custom basis at a charge of from $2.00 to $2.50 an acre.

A variety of methods and machines were used in curing the beans and getting them threshed. Two-thirds of the growers used side-delivery rakes to throw together two or more windrows soon after cutting; on two farms a buncher was pulled behind the cutter in one operation; on three farms sulky rakes were used; and on one farm the beans were hand-piled following cutting. A number of growers who used rakes to windrow used hand labor to fork the beans into piles before stacking. About half of the farmers stacked the beans, using either hay sweeps or pitching them on sleds or wagons and hauling them to the stack. After curing in the stack, the beans were threshed with stationary bean threshers. Two of the growers hauled the beans directly from the field to the threshing machine. A uniform custom rate of 15 cents a bushel for threshing prevailed throughout the valley, with the farmer furnishing the threshing crew. The beans were combined directly from the windrow on about half of the farms. The prevailing custom rate for this operation was 25 cents a bushel for the combine, tractor, and driver.

Either stacking and threshing from the stack or combining from the windrow is a satisfactory method of handling the crop. Stacking minimizes weather damages and the crop can be threshed after the rush of harvesting other crops. On the other hand, combining from the windrow saves labor. Average man-hours of labor per acre for harvesting, threshing and marketing the crop by various methods were: 4.5 for combining from the windrow; 7.4 for threshing direct from the field; and 15.7 for threshing from the stack.

A recommended practice for preventing bean ground from blowing during the winter is to plant fall rye, although a number of growers were controlling blowing by blank listing or other methods of roughing the soil surface.

The operations performed in growing a bean crop on one irrigated farm are given below. These operations are fairly typical of the area except that about half of the growers combined the beans directly from the windrow.

Operation	Times over	Implement used
Disk	1	7-foot tandem disk
Plow	1	2-way moldboard plow
Harrow	1	3-section spike-tooth harrow
Float	1	10-foot wood float
Plant	1	4-row beet and bean planter
Irrigate	1	First application
Harrow	1	3-section spike-tooth harrow
Cultivate and ditch	3	4-row beet and bean cultivator
Irrigate	3	Hand labor
Hoe	1	Hand labor
Harvest	1	4-row bean puller
Windrow	1	Side-delivery rake

Operation	Times over	Implement used
Pile	1	Hand labor with forks
Stack	1	Sleds, hand-pitched
Thresh	1	Custom basis, stationary thresher, 8-man crew
Haul to market	1	Truck
Blank list	1	2-row lister

Colorado Dry-Land Area

Experienced bean growers emphasized the necessity for preparing a good seedbed for beans and killing as many of the weeds as possible before planting. Where beans followed small grains or row crops other than beans the land was usually plowed early in the spring and disked from one to three times before planting. On a number of farms, the land was prepared for planting by from one to three diskings or one-waying and harrowing. On fields where beans followed a previous bean crop a common practice was to blank-list in the fall to help control soil blowing. Where this was done it was considered advisable to work down the ridges with a disk cultivator and harrow or split the ridges with a lister before planting.

Three-fourths of the beans were planted with lister planters and one-fourth were surface-planted with furrow openers. Both two- and four-row planters are used in the area. Ordinarily the rows were spaced 38 inches apart. An average of 13½ pounds of seed was planted to the acre. In 1943, the most common planting period was from June 1 to 20, but the range was from May 10 to June 30.

The amount of cultivating required varies with the season. In 1943, the farmers interviewed cultivated an average of from two to three times. In addition, the beans were usually harrowed at least once either before or soon after the first cultivation. Regardless of the season it is desirable to "lay by" the crop with the soil "thrown in" well around the plants, otherwise the crop is difficult to harvest with a bean cutter because the vines are down in the furrow.

As there was little rain after planting time only a small amount of hoeing was needed, and on one-third of the farms hoeing was unnecessary. For those on which hoeing was done the time spent per acre ranged from ¼ to 3 1/3 hours. On all farms an average of a little more than an hour of hoeing labor was used per acre.

Harvesting methods were more standardized in the Colorado area than elsewhere. Practically all growers used two-row bean cutters. Ordinarily these were commercially-made machines; however, a few were made locally by attaching blades to listers or cultivators in place of the regular lays or shovels. Both types seemed to work satisfactorily. Unless the beans were to be combined from the windrows, a commercially-made

piler was usually drawn behind the cutter. Of the 20 farmers, 13 used mechanical pilers, 2 windrowed with side-delivery rakes, and 5 did all the piling by hand. The piler picks up the vines from the windrow and elevates them onto a canvas which is tripped by hand to deposit the beans in small piles. The combined cutter and piler can be operated by one man. The piling machine sells locally for $225. Those who used the mechanical buncher usually performed the additional operation of forking either two or three rows of piles together. This made it possible to drive between the pile-rows with wagons or sleds and saved handling after the beans were cured, thus avoiding excessive shattering. A crew of from two to three men can do the hand piling job and keep up with the cutting and piling machine.

Fifty-five percent of the growers threshed from the field and 30 percent from stacks. In both cases stationary bean hullers were used. Either sleds or wagons were used to haul the crop from the field. The remaining 15 percent of the growers combined from the windrow. From the standpoint of saving labor, combining from the windrow is the most efficient method and threshing from the stack the least efficient. The average number of hours of labor used per acre from harvesting through marketing were as follows: Combining from the windrow, 2.2; threshing from the field, 4.1; threshing from the stack, 6.5. If labor continues scarce the trend will probably be toward greater use of the windrow combines for threshing beans. Some of the reasons given for not using this method were: (1) additional risk of loss due to rain or wind shattering; (2) combines crack more of the beans; (3) they already have a stationary bean huller or one is available when needed; (4) windrow threshing wears out a combine because of the excessive quantity of dirt; (5) combines do not thresh as clean and beans are lost through incomplete threshing; and (6) weedy beans are difficult to thresh with combines. Most of these objections are not insurmountable.

As bean ground is extremely subject to blowing, strip cropping of beans with corn or sorghum is a recommended practice, especially on lighter soils. Planting to winter grain and fall listing are other methods used to prevent excessive soil blowing.

Typical practices in the Colorado area are illustrated by the operations performed on one farm.

Operation	Times over	Implement used
Plow	1	2-bottom, moldboard plow
Disk	1	8-foot tandem disk
Harrow	1	3-section spike-tooth harrow
Plant	1	2-row lister planter
Harrow	1	3-section spike-tooth harrow
Cultivate	1	2-row lister cultivator
Cultivate	1	2-row shovel cultivator
Harvest	1	2-row bean puller and mechanical piler

Continued,

Operation	Times over	Implement used
Pile	1	Hand pile six rows together
Thresh	1	Hauled to bean huller on sleds, 5-man crew
Haul to market	1	Pick-up truck

Western Nebraska Dry-Land Areas

The most common method of preparing the land for planting beans in Chase and Box Butte Counties was to disk from one to three times with a tandem or single disk. Of 27 farmers interviewed 63 percent followed this method; 11 percent disked and blank-listed before planting; and 26 percent plowed the land and worked it down by disking and harrowing before planting. In general, the procedure for preparing the land for beans was the same as for corn. A number of growers thought that additional tillage was needed before planting the beans to control weeds.

The range in planting dates was from May 15 to July 1, with most of the planting being done in the first half of June. The beans were ordinarily planted with two-row planters in rows 42 inches apart, with 88 percent listed and the rest surface-planted. Some used corn plates, which usually proved unsatisfactory because they did not plant uniformly enough seed. Specially-made bean plates for use in corn planters would have been more satisfactory. An average of 12.9 pounds of seed was planted per acre; although some planted as much as 19 pounds and others as little as 8 pounds to the acre. A number of growers who planted a small quantity of seed were of the opinion that they should have planted 12 to 15 pounds per acre.

The beans were cultivated an average of two times - the range was from one to four cultivations. Except where the beans were surface-planted, disk cultivators (go-digs) were ordinarily used for at least the first two cultivations. One of the more successful methods of controlling the weeds in the row was to harrow the land soon after planting. This was done by about half of the operators.

An average of 3.4 hours of hoeing labor was used on all farms even though only half of the growers did any hoeing. A number of growers who controlled the weeds by this method had such high labor costs that the crop was unprofitable. Some who did not hoe had so many weeds in the beans that they were difficult to harvest and thresh. A few growers, however, succeeded in controlling weeds by careful seedbed preparation and timeliness of cultivation.

As yields were low, and as in many cases only a small acreage was to be harvested, many growers did not go to the expense of getting the machinery needed or converting other machinery in order to do an efficient job. Of the 27 growers interviewed, 4 did not harvest the beans, which

left 23 for whom the method of harvesting was ascertained. Of these, 43 percent used cultivators or listers with blade attachments; 31 percent pulled the beans by hand; 17 percent used potato diggers or rod weeders; and 9 percent used regular bean pullers. Some of the improvised machines did not work successfully, whereas others did a satisfactory job. The best method of utilizing available machines to pull the beans was to attach long blades in place of cultivating shovels. The potato diggers were used without chains and did not separate the vines from the soil. Rod weeders left the vines strung out over the ground.

As side-delivery rakes were not available on many farms, the vines were usually windrowed or piled by hand and threshed with combines. An average of 2.8 hours of labor was used for harvesting and marketing the beans where they were machine pulled and combined from the windrow as compared with 6.2 hours by other methods. Small 5- to 6-foot combines with windrow pick-up attachments were used. A good many growers experienced considerable loss of beans from shattering in the field and cracking by the combines. The latter difficulty can be largely overcome by reducing the cylinder speed and increasing the clearance of cylinder and concaves. The prevailing custom rate for combining beans was 25 cents per bushel.

Soil blowing following harvest is one of the main hazards encountered in producing beans in dry-land areas, such as western Nebraska. To a certain extent this can be controlled by fall listing and strip cropping with corn or sorghums.

The operations performed by one bean grower in Chase County are given below. Practices varied so much between farms that no one set of operations can be considered entirely typical. Tractor-drawn machinery was used.

Operation	Times over	Implement used
Disk	2	7-foot tandem
Plant	1	2-row lister planter
Cultivate	2	2-row lister cultivator
Harvest	1	Blade attachments on lister
Pile	1	By hand with forks
Thresh	1	6-foot combine, pitched in by hand
Haul to market	1	Pick-up truck (Sterling, Colorado, 80 miles)

Comparison of Practices in Established and New Dry-Land Areas

A study of 1943 bean growing practices under dry-land conditions in the well established area of Colorado and the new area of western Nebraska shows considerable contrast in methods. These differences are due to the

peculiarities of the areas, the amount of experience the growers have had in growing beans, and the machinery available for handling the crop. Only to the extent that the practices used in Colorado have resulted from greater experience, can they be used as a guide for growers in newer areas. The most significant differences from this standpoint are listed below:

(1) The experienced growers went to greater effort to prepare the land for planting and kill the weeds before planting. Planting dates averaged slightly later.

(2) They planted in rows closer together with uniformly more seed to the acre. Several growers were of the opinion that the beans set better where the vines more nearly cover the ground.

(3) They did more harrowing to control weeds while the beans were small.

(4) A larger percentage of the experienced growers hoed to control weeds, but less labor was used per acre for hoeing because of fewer weeds.

(5) More timely pulling and use of better adapted pulling machinery resulted in fewer beans being lost by shattering.

(6) More experience in regulating threshing machinery together with the use of better adapted machines resulted in fewer beans being cracked in threshing.

Some of the practices that could be shown in tabular form are given in table 5. To show the differences between irrigated and dry-land bean practices the figures for Scotts Bluff County were included.

Table 5.- A comparison, by areas, of certain practices and labor inputs for growing beans, 1943

Practices or inputs	Dry-land areas: Western Nebraska	Dry-land areas: Colorado	Irrigated area: Scotts Bluff
Normal width of rows	42 in.	38 in.	20 in.
Most common planting period	May 20 - June 15	June 1 - 20	May 25 - June 15
Aver. planting rate (Lbs. per acre)	12.9 lbs.	13.5 lbs.	56 lbs.
Average number of cultivations	2.2	2.4	3.8
Percentage who hoed	48.0	70.0	90.0
Hours hoeing labor per acre (aver.all growers)	3.4	1.2	4.5
Percentage who combined from windrow	30.0	15.0	47.0
Harvesting, threshing and marketing labor (Aver. hrs. per acre)	5.1	4.5	9.5
Total labor per acre	10.7	8.0	28.9

INTERCHANGEABILITY OF BEANS WITH OTHER CROPS

Dry-Land Areas

Cropping system: Systems of farming are necessarily flexible in the dry-land areas to allow for variations in moisture conditions. For this reason there is no standard method of working beans into the cropping system. Beans are sometimes raised as a catch crop for corn because of a later planting date and are planted to some extent on abandoned wheat land, particularly if planting conditions for spring grain are unfavorable.

Those farms producing both row crops and small grains have the least difficulty in fitting beans into the cropping system. Beans are often planted on land that was in small grain the preceding year. In years when the bean crop is harvested early enough some farmers plant winter wheat on bean land. On other farms the bean crop may be followed by a spring grain or the land may be fall-listed and replanted to beans or corn the following spring.

On specialized wheat farms beans are mostly a new crop and occupy a minor part of the cropland. In no case did they take land from wheat. Generally beans were planted on land that was idle the previous year or that would otherwise have been summerfallowed. This tends to reduce the acreage of wheat on fallow. The reduction in yield of wheat when beans are substituted for fallow varies by areas.

Labor calendar: The introduction of beans in rotation with wheat causes a conflict in the use of seasonal labor between the final cultivation of beans and the wheat harvest. To perform the bean cultivation earlier would be poor practice because a more complete job of weed eradication can be accomplished on the later date. Corn in the same position in the rotation would cause no difficulty because corn is "laid by" before wheat harvest. Beans in a rotation without wheat cause no serious conflict in the use of labor, although hoeing beans and cultivating corn conflicted on some farms. However, wheat was grown on all but 10 percent of the sample farms.

Machinery: Farms equipped for row-crop production had little difficulty providing bean machinery. Direct use was made of this machinery up to harvest time when a special pulling machine was required. Farmers that regularly grow beans usually have a specialized harvesting machine. Other growers performed the job with improvised attachments which were made locally at little additional cost. In established bean-growing areas custom contracting of machine work eased the machinery problem for farmers with inadequate equipment.

Marketing facilities: Considerable specialized machinery is needed for cleaning and grading beans. In areas in which beans are a major crop, the cleaning, grading, and marketing are done by specialized

concerns or by grain elevators especially equipped to handle beans. Local markets were not available in Chase and Box Butte Counties, chiefly because beans were a new crop and production was not sufficiently great or did not seem to be permanent enough to warrant special marketing facilities.

Managerial requirements: Bean producers in the dry-land areas indicated that managerial requirements are higher for beans than for other field crops. The additional requirements involve more careful attention to timeliness of operations, particularly harvesting, and the supervision of a larger labor force.

Irrigated Area

Rotations: Beans, beets, potatoes, and alfalfa grown under irrigation usually occur in the following sequence in the rotation: Small grain with alfalfa - alfalfa - alfalfa - potatoes - beans - beets. Those farmers omitting either potatoes or beets from this rotation usually substitute beans or corn. These rotations are shortened 1 or 2 years when sweetclover replaces alfalfa as the soil-building crop.

The large increase in acreage of beans in recent years has been made mainly at the expense of corn and beets, although, to a small extent, it is a substitution for small grains and legumes. Without some substitution of crops with lower mid-summer water requirements there is little opportunity to increase the total acreage of row crops in the Scotts Bluff area. The present ditch capacity for irrigation water was fully utilized during the peak months of July and August. Increases in acreage of one row crop, therefore, will have to be made largely at the expense of other row crops in the rotation.

Labor calendar: No serious conflicts arose in the use of seasonal labor between beans, beets, and potatoes. Of the three crops, beets require more labor for hoeing and have the additional operation of thinning. Ordinarily, cultivations of beans and other row crops work well together. The harvesting of beans comes ahead of potatoes and beets. On farms where beans are combined from the windrow this operation precedes the potato and beet harvests. On farms where the beans are stacked, threshing follows the potato and beet harvest.

Machinery: Pre-harvest operations on beans and beets and all except planting on potatoes were performed with the same machinery. An interchanging of these crops, therefore, would be relatively easy. Specialized harvesting machinery is used for each crop. The farms were already equipped with bean-harvesting machinery or such machinery was available on a custom basis.

Marketing facilities: Beans were marketed through specialized bean elevators conveniently located in the irrigated area.

Managerial requirements: According to growers the managerial requirements for producing beans are considerably less than for either potatoes or sugar beets. Less than one-third as much labor per acre must be secured and supervised for producing beans as compared with beets or potatoes. Also there is somewhat less risk of loss from frost on beans when a shortage of labor causes delay in harvest and beans are a less bulky commodity to transport and market.

BEANS: COSTS AND RETURNS COMPARED WITH COMPETING CROPS

Dry-Land Areas

Costs and returns on beans were calculated for each of the dry-land areas, together with comparisons on costs and returns from corn, which was considered the crop with which beans most nearly compete.

1943 costs and returns: Acre costs of producing beans were lower in the established dry-land Colorado area than in the western Nebraska counties, even though a larger yield was harvested in Colorado (table 6). Lower cost resulted primarily from the use of more efficient harvesting machinery and less hoeing to control weeds, the latter being due, in part at least, to better seedbed preparation. Labor and machinery costs were higher in Box Butte County than in Chase County because a higher percentage of the acreage was harvested, yields were higher, and more of the beans were pulled by hand. Corn production costs were higher in Box Butte County than in the other areas because of additional preparation of land before planting.

The returns from beans and corn in 1943 (table 7) were influenced considerably by yield differences between areas. The prices used are average prices received on the sample farms for the 1943 crop. Prices for beans averaged somewhat lower in Box Butte County because of some discoloration. Value of bean straw and cornstalks were based on farmer estimates. The variation between areas in value of bean straw resulted mainly from differences in harvesting methods. Where the beans were threshed with a combine in the field the straw was often not utilized as feed.

On the farms studied, beans were more profitable in 1943 than corn in the Colorado area and less profitable than corn in the two Nebraska Counties (table 7). In Box Butte County corn was considerably more profitable than beans for owner-operators or tenants but a landlord got a slightly higher return from beans. A number of tenant farmers recognized this fact when they said, "the rental share is too high on beans".

Cost and returns adjusted for average yields: As the 1943 yield relationship between beans and corn on sample farms in the Colorado area differed considerably from the historical relationship, the returns on the two crops were recalculated on the basis of normal yields for the

Table 6.- Cost per acre of producing beans and corn in selected dry-land areas of Colorado and Nebraska, 1943 1/

Crop and County	Labor	Tractor power	Horse power	Machinery	Seed	Other	Total
	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.
Beans:							
Colorado	4.04	1.68	.35	1.80	.87	---	8.74
Box Butte County	5.30	1.82	.54	2.85	.96	.11	11.58
Chase County	4.93	1.74	.11	2.18	.96	---	9.92
Aver. of Box Butte & Chase Counties	5.14	1.79	.36	2.57	.96	.07	10.89
Corn:							
Colorado	1.91	.90	.81	.62	.19	---	4.43
Box Butte County	2.36	1.50	.67	.84	.19	---	5.56
Chase County	1.85	.95	.64	.68	.22	---	4.34
Aver. of Box Butte & Chase Counties	2.11	1.23	.65	.76	.21	---	4.96

1/ Method of calculating costs: Information was obtained from farmers on quantity inputs of labor, power, machinery, seed and other items. As much of the labor was done by the operator or by members of the family, cash costs on labor were not available from the farmer. In summarizing the cost information a uniform charge was made for labor on all records, based on wage-rate reports of the Bureau of Agricultural Economics. The labor charge was varied seasonally, being 0.47 an hour for the spring months, 0.50 for the summer months, and 0.55 for the fall months. Charges for the use of tractor power and machinery were computed from the hours of use as estimated by the farmer and a basis for calculating rates per hour was furnished by the Nebraska Agricultural Experiment Station. Where the farmer hired the machinery work, the custom rate was used. Horse labor was charged at 15 cents an hour. No charge was included for management or for indirect costs such as, automobile expense and fencing, which are difficult to calculate by enterprises. Returns are shown in table 7 both with and without a rental charge for land.

area (table 8). Similar calculations were not made for the Nebraska dry-land areas because beans have not been grown in those areas in sufficient quantity to establish yield expectancies.

During the years 1927 to 1941, the county average yields on dry-land farms in the Colorado area were 225 pounds of beans and 8.5 bushels of corn per acre planted.

Table 7.- Returns per acre from beans and corn in selected dry-land areas of Colorado and Nebraska, 1943

Crop or County	Yield	Farm price (Per cwt.)	Return	Value bean straw or corn stalks	Gross income	Calculated costs	Return above listed costs	Land charge (share rent) 1/	Return above listed costs & share rent
	Lbs.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.
Beans:									
Colorado	283	5.75	16.27	.74	17.01	8.74	8.27	4.36	3.91
Box Butte County	256	5.46	13.98	.26	14.24	11.58	2.66	4.35	-1.69
Chase County	128	5.75	7.36	.12	7.49	9.92	-2.43	2.46	-4.89
Aver. of Box Butte & Chase Counties 2/	202	5.54	11.19	.20	11.38	10.89	.49	3.54	-3.05
Corn:	Bu.	Per bu.							
Colorado	7.8	.95	7.41	1.00	8.41	4.43	3.98	1.81	2.17
Box Butte County	13.0	.97	12.67	1.00	13.67	5.56	8.11	4.15	3.96
Chase County	13.9	.98	13.63	1.00	14.63	4.34	10.29	4.67	5.62
Aver. Box Butte & Chase Counties 2/	13.5	.97	13.15	1.00	14.15	4.96	9.19	4.41	4.78

1/ The customary share rent was one-fourth on all crops in the Colorado area and one-third in the Nebraska Counties.
2/ These averages were weighted by the number of records in each county.

Table 8.- Returns per acre from beans and corn in the Colorado area with average yields

Crop	Average yield	Farm price	Return	Value bean straw or corn stalks	Gross income	Calculated costs 1/	Return above calculated costs	Land charge (share rent)	Return above listed costs and share rent
		Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.
Beans	225 lb.	5.75	12.94	.74	13.68	8.65	5.03	3.24	1.79
Corn	8.5 bu.	1.00	8.50	1.00	9.50	4.43	5.07	2.12	2.95

1/ The threshing rate on beans is based on the yield which made for the slightly lower total acre costs than those incurred in 1943.

With these average yields and 1943 costs and prices, returns per acre (returns above calculated costs) of owner-operators in the Colorado dry-land area would be about equal for beans and corn. Returns to a landlord (share

rent) would be higher from beans, whereas those to a tenant operator would be higher from corn.

In addition to costs and returns there are certain other considerations that influence the individual farmer in deciding the proportion of beans and corn to produce. Since beans require over twice as much labor as corn, this offers an opportunity for those farmers having a large family labor force to utilize it efficiently. Other farmers who have to hire considerable labor prefer producing the lower labor-requiring crops when labor is scarce. The addition of a bean enterprise gives a more even seasonal distribution of labor on row-crop farms but, as previously mentioned, causes a conflict in the use of labor and tractor power on farms growing wheat. Farmers who grew large acreages of beans in 1943 were influenced also by the availability of nonrecourse bean loans which insured them against a complete crop failure.

Irrigated Area

Costs and returns from beans in the irrigated valley in Scotts Bluff County were compared with the costs and returns from sugar beets and potatoes. Costs were calculated by the same methods used in the dry-land areas. Contract labor on beets and hand work on potatoes were charged at the going rate 3/.

Table 9.- Cost per acre of producing beans, beets, and potatoes under irrigation, Scotts Bluff County, Nebraska, 1943 1/

Crop	Labor	Tractor power	Horse power	Machinery	Seed	Fertilizer	Other costs	Total of listed costs
	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.
Beans	14.83	4.27	1.55	8.74	4.82	2.59	.04	36.84
Beets	53.87	4.38	1.46	9.04	2.49	17.20	---	88.44
Potatoes	47.26	5.22	1.35	15.57	29.17	2.98	20.35	121.90

1/ Average yield per acre: Beans, 1,679 lbs.; Beets, 15.3 tons; potatoes, 218 bushels.

Operating costs per acre of producing beans in 1943 were less than one-half the cost of producing beets and less than one-third the cost of producing potatoes on the sample farms in Scotts Bluff County (table 9).

3/ Contract rates for labor on beets were: For bunching and thinning $12.00 an acre; hoeing $3.50 an acre; weeding, $2.50 an acre; pulling or topping, $1.25 a ton for the first 12 tons and $1.15 a ton for additional yield in excess of 12 tons. Picking rates on potatoes varied from $.06 to $.08 per bushel.

Uncalculated costs, such as the management cost of obtaining and supervising labor, were greater for beets and potatoes than for beans. The cost of sacks and insecticides for potatoes are included under the heading "other costs". No separate charge was included for irrigation water which is a landlord cost in this irrigation project and as such is covered in the share-rent payment. Landowners paid $1.35 an acre to the Reclamation Service for operation and maintenance irrespective of the quantity of water used. They paid varying amounts for project construction costs. Manure was valued at $1.50 per load, including the cost of spreading.

1943 returns from beans: Most of the farmers interviewed were well satisfied with their returns from beans in 1943; nevertheless, on a cost and return basis, more income per acre was received from beets and potatoes than from beans (table 10). After deducting a rental share for the use of the land along with other costs that could be determined, the return from beans amounted to $36 an acre as compared with $46 from beets and $66 from potatoes.

Table 10.- Returns per acre from beans, beets, and potatoes, under irrigation, Scotts Bluff County, 1943

Crop	Yield	Farm price	Return	Value bean straw or beet tops 1/	Gross income	Calculated costs	Return above calculated costs	Land charge (share rent) 2/	Return above listed costs & share rent
		Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.
Beans	1,679#	5.70	95.56	1.12	96.68	36.84	59.84	23.92	35.92
Beets	15.3 Ton	11.00	168.28	11.48	179.76	88.44	91.32	44.94	46.38
Potatoes	218 Bu.3/	1.15	250.70	---	250.70	121.90	128.80	62.67	66.13

1/ Bean straw was used mainly for bedding so had a relatively low value for the quantity produced. Beet tops were valued on a piled-in-the-field basis at $.75 per ton of beets harvested.

2/ The most common share rent was one-fourth on beans, beets, and potatoes. The landlord share of beet tops varies considerably between farms, but would average about one-fourth.

3/ Most of the potatoes were not sold at the time the study was made. A 10-percent reduction was made in harvested yields to allow for shrink and spoilage. Prices were farmer estimates.

Returns adjusted to average yields: Bean yields have been above average in recent years in Scotts Bluff County. From 1931 to 1934 - the earliest years for which yields were reported - an average of 985 pounds was harvested per acre. The average yield for the period 1939 to 1942 was 1,695 pounds, an increase of 325 pounds over the 4 previous years and 710 pounds over the 1931-34 period. The average yield for the 12-year

period was 1,349 pounds 4/. During this same period of years, potato yields have also increased materially. The average yield was 190 bushels. Beet yields have varied considerably from year to year, but have not shown an upward trend comparable to beans and potatoes. The average yield of beets for the 12-year period was 13.8 tons.

The returns from beans, beets, and potatoes was recalculated using 1943 prices and the average yield for the years 1931 to 1942 (table 11). Costs were adjusted for the three crops for differences in harvesting costs consistent with lower yields.

Table 11.- Returns per acre from irrigated beans, beets, and potatoes, with average yields, Scotts Bluff County, Nebraska

Crop	Yield	Farm price	Return	Value bean straw or beet tops	Gross income	Calculated costs	Return above calculated costs	Land charge (Share rent)	Return above listed costs & share rent
		Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.
Beans	1,349#	5.70	76.89	1.12	78.01	35.90	42.11	19.22	22.89
Beets	13.8 T.	11.00	151.80	10.34	162.14	85.91	76.23	40.54	35.69
Potatoes	190 Bu.	1.15	218.50	---	218.50	116.18	102.32	54.63	47.69

The adjustment of returns to average yields lowered the return for all three crops. Returns from beans were lowered more than those from beets and less than those from potatoes.

Based on these income and cost calculations a tenant operator would need a price of $6.95 per hundredweight for beans to give a return per acre comparable to beets priced at $11.00 a ton. A price of $8.00 a hundred for beans would be needed to match returns from $1.14 potatoes. A series of farm prices for beans, beets, and potatoes that would give comparable returns above calculated costs to a tenant farmer in the Scotts Bluff irrigated area are given in table 12.

4/ Those familiar with the area attribute higher yields in recent years mainly to: (1) Improved practices that come with experience and more attention as beans become a major crop instead of a minor one; (2) the use of better land for beans and more adequate irrigation; (3) the use of more certified seed which tends to lower the risk of disease; and (4) comparatively good weather conditions in recent years at harvest time and during the season when blight damage might occur.

Table 12.- Calculated farm prices for beans, beets, and potatoes that would give equal acre returns above 1943 calculated costs to a tenant operator with average yields in the Scotts Bluff irrigated area

Beet price (per ton)	Bean price (per 100 lb.)	Potato price (per bu.)	Operator's return above listed costs
Dollars	Dollars	Dollars	Dollars
9.00	4.90	.91	15.00
9.50	5.45	.95	20.18
10.00	5.95	.99	25.35
10.50	6.45	1.03	30.53
11.00	6.95	1.07	35.70
11.50	7.50	1.10	40.88
12.00	8.00	1.14	46.05
12.50	8.50	1.18	51.23

Other considerations: When viewed in light of the price received for beans in 1943 and the operators' intentions to maintain bean acreages in 1944 (as discussed in the following section), the calculated bean prices needed to match the returns from beets and potatoes indicate that considerations other than prospective returns per acre are extremely significant as farmers weigh the advantages and disadvantages of producing beans in the Scotts Bluff irrigated area. Doubtless the decisions of some farmers were influenced by the high bean yields obtained in recent years but these high yields could not be expected to offset all of the differences in prospective returns.

Other significant considerations include the ease with which beans are substituted in the crop rotation for more intensive, higher costs cash crops. A partial substitution of beans for beets on farms with beets and potatoes in the rotation gives a better seasonal distribution of labor. On some farms this made it possible to do a larger proportion of the work with operator and family labor. Beans also offer farmers a cash crop with a relatively low investment risk as the cash cost of producing beans is much smaller than that incurred in the production of either beets or potatoes.

Management requirements represent still another very real, though unmeasurable, factor in farmers' decisions to increase or decrease the acreage of beans. Because of the manual nature and the quantity of labor required in producing sugar beets and potatoes, the producer must expend more time and effort in obtaining and supervising labor for these crops than is required for beans. Also, more skill and effort is required in planning the operations on the more intensive crops. These factors have become increasingly important as labor uncertainties have developed during the wartime emergency. Uncertainties at planting time as to the quantity of labor which would be available during the growing and harvesting seasons, together with a reduction in the quality of labor available,

have increased materially the danger of loss from intensive, high-cost crops. On the other hand, many farmers have had sufficient labor in sight to produce at least a moderate acreage of dry beans and no doubt have been willing to forego some cash income in order to reduce the risk and the effort that would have been required in producing the more intensive crops.

1944 PRODUCTION PLANS

Adjustments in bean acreage which farmers (in November 1943) planned to make in 1944 are shown in table 13. Plans in the established bean areas were decidedly more optimistic than in the new bean areas where farmers were disappointed in the bean yields obtained in 1943.

Table 13.- Proportion of farmers planning (in November 1943) to make specified change in bean acreage in 1944 1/

Planned change in acreage in 1944 compared with 1943	Box Butte County, Nebraska	Chase County, Nebraska	Colorado area	Scotts Bluff County, Nebraska	Total
	Percent	Percent	Percent	Percent	Percent
Increase	11	10	25	21	18
Decrease	55	45	10	0	25
No change	17	45	65	53	46
No opinion	17	0	0	26	11

1/ These intentions reflect an assumed continuation of the RACC production loans and were considered jointly with suggested prices considered necessary to maintain bean production in 1944, shown in table 14. Price, however, was a minor consideration in Box Butte and Chase Counties because of low yields.

Despite the fact that calculated returns per irrigated acre in 1943 were considerably lower from beans than from either sugar beets or potatoes, none of the farmers in the Scotts Bluff area from whom an opinion was obtained planned to decrease their acreage of beans in 1944. More than one-fourth of them planned an increase. In the Colorado area only 1 in 10 planned to decrease their bean acreage and 1 in 4 planned to increase it. This reaction was contingent on a continuation of RACC production loans considered jointly with suggested prices considered necessary to maintain bean production in 1944. On the other hand, about one-half of the farmers interviewed in the newer bean areas planned to reduce their bean acreage and only 1 in 10 planned an increase, even though most operators in these new bean areas were satisfied with the price received for their 1943 crop. Major decreases were planned by those growers in the new bean area who planted more than 25 acres in 1943. Most of those growers who planned to maintain or increase bean acreage in 1944 were willing to continue with a small acreage because of the need for beans as a war food crop.

Farmers' opinions as to the farm price for beans which will be needed to encourage the maintenance of bean production in 1944 are summarized in table 14. These opinions were obtained before the announcement of the 1944 support prices for beans at the 1943 level. When considered jointly with farmers' plans to adjust bean acreages (table 13) however, they may give some indication of the probable effect of the announced support prices on acreage of beans in 1944.

Table 14.- Farmer suggested bean prices for 1944, by areas

Price for U.S. No. 1 Grade	Box Butte County, Nebraska	Chase County, Nebraska	Colorado area	Scotts Bluff County, Nebraska
Dollars	Number reporting	Number reporting	Number reporting	Number reporting
5.75 cwt.	12	8	7	15
6.00 do. 1/	3	2	1	3
6.50 do.	---	---	4	---
7.00 do.	---	1	3	---
7.50 do.	1	---	1	---
8.00 do.	---	---	1	---
No. opinion	2	---	3	1

1/ This group includes 3 farmers in Scotts Bluff, 2 in Chase, and 1 in Box Butte County, who suggested a "small increase over the 1943 price".

Farmers in Scotts Bluff County were satisfied generally with the 1943 bean price. One out of six suggested a small increase over the 1943 price but as none of them planned to decrease their bean acreage, it is probable that the 1944 support price will at least maintain the acreage of beans in this area at the 1943 level. However, the announced increase in 1944 support prices for sugar beets will tend to retard the increase in bean acreage which might otherwise have occurred in this area.

More than half of the farmers interviewed in the Colorado area thought that some increase in the price of beans was needed. An average of the farm prices suggested was 65 cents per hundred higher than the 1943 price. Although the cost and return comparison shows that prospective returns (based on 1943 prices) from beans are about equal to corn, the large plantings in this area in 1943 were secured with the aid of the risk protection offered by RACC production loans. The planned acreage changes shown in table 13 were dependent on a continuation of these loans and considered jointly with the suggested bean prices considered necessary to encourage the maintenance of bean production in 1944. Since the 1944 support price has been announced at the 1943 level it is probable that plantings will be decreased in this area from the high level attained in 1943.

Apparently the general satisfaction with 1943 bean prices reported by the farmers interviewed in the new dry-land areas of Nebraska merely indicates that 1943 yields were generally so low that price was not an important consideration. Many operators in these areas incurred a financial loss in attempting to produce beans in 1943 and about one-half of them planned either to reduce the size of their bean enterprise, or to eliminate it entirely in 1944.

One factor, not fully considered in the planned adjustments which may tend to offset to some extent the downward trend in acreage is the possibility of a greater than normal abandonment of winter wheat in the spring of 1944 brought about by dry weather in the fall and winter of 1943. Some of the abandoned wheat land will probably be planted to beans in 1944, particularly if the drought continues beyond the planting date for spring grain. Yields from such acreage probably will be low, however, and it is not likely that the 1944 support prices will provide sufficient inducement to maintain bean production in these areas in 1944.

SUGGESTIONS FOR ENCOURAGING BEAN PRODUCTION IN 1944

A need for a more careful consideration of production opportunities in allocating dry bean goals among counties is indicated by the experiences of these farmers in 1943. More favorable weather in the new bean areas would have prevented many of the difficulties encountered, but some of the unfortunate experiences of 1943 will tend to increase the difficulties to be overcome in meeting production requirements for dry beans in subsequent years. The experiences of these farmers suggest certain types of action which would help to alleviate such difficulties.

Determining bean acreage per farm in 1943: The desire of farmers to participate in producing war crops and a uniform allocation of county production goals per farm, based on a percentage of the cropland, largely determined the acreage of beans per farm in 1943. A more careful appraisal of the possibilities for growing beans on each farm would assist in overcoming some of the difficulties encountered during the last year. This appraisal should give due consideration to the desirability of growing beans on a medium-light-textured soil, the availability of family labor for hoeing, whether the operator will cooperate fully in growing the crop, encouraging a higher proportion of the bean acreage on farms of experienced growers, and encouraging beans on farms that emphasize row crops in the rotation. Above all, emphasis should be placed on getting beans produced rather than getting a large acreage planted.

Seed: Greater emphasis will be needed in 1944 on the use of good seed because many farmers have saved home-grown beans for seed. The use of locally grown beans for seed should be discouraged because of the danger of blight infection and low germination. Certified seed of the Great Northern variety is strongly recommended in adapted areas by those familiar

with bean diseases. If this is not available, seed one year removed from certification would be fairly satisfactory. The additional cost to the grower is relatively minor as the additional cost of certified seed is only 3 to 5 cents per pound.

Machinery: A shortage of side-delivery rakes handicapped production of beans in Box Butte County, in 1943. Without these rakes to windrow beans, farmers were obliged to perform the job with hand labor. If sufficient machines cannot be made available the need could be adequately met by allocating several rakes to the county for use on a community basis.

Marketing pool: In areas far from market there is need for a plan whereby growers with small acreages of beans could pool production for transportation to a processing plant. This could be facilitated by designating a reception center in a nearby town where a farmer could bring his crop to be included in a common load. The costs of transportation to the processing plant could be prorated, thus avoiding a long expensive haul for the individual. The purchase of thresher-run beans by county agricultural conservation committees, as announced with the 1944 price programs, could meet this need.

Production loans and risk insurance: A continuation of the RACC nonrecourse production loan program or a substitute plan would undoubtedly assist in maintaining bean production, especially on dry-land in 1944. A more inclusive program guaranteeing cost of production with an allowance for land charges would appeal to a number of farmers because abandonment of the bean crop usually comes too late in the season to allow planting a catch crop on the land.

The need for some type of risk protection to cover bean production was indicated by about one-third of the growers interviewed. The RACC loan was used in 1943 more in the dry-land areas by growers having large acreages but most of the growers in the area were not opposed to such a program.

Those farmers indicating a need for risk insurance did not advocate a particular plan. The RACC nonrecourse loan offered in 1943 on war crops, such as beans, was well liked by the majority of users. These loans appealed to the growers as protection against crop failure rather than as a means of financing the crop. A minor criticism was the involved procedure necessary in obtaining the loan and also that loans were made to operators who did not make the necessary effort to care for the crop.

Dissemination of information: Although the Extension Service and others gave much assistance to farmers in producing beans in 1943, a continuation of this effort in 1944 is necessary. Farmers in new bean-growing areas need additional information on seedbed preparation, the amount to seed per acre, weed control, best harvesting methods, ways to help avoid loss from shattering, and threshing practices that result in minimum loss from cracking. Many new bean growers have learned some of these practices the hard way. But additional information on proven practices will assist them and other new growers in producing more beans at a lower cost in 1944.

with been dilemma. If this is not available, sand can have removed from dentification would be fairly satisfactory. The additional cost to the grower is relatively minor as the additional cost of sanitized seed is only 3 to 5 cents per pound.

Equipment: A shortage of side-delivery rakes handicapped production of beans in Bates County, in 1960. Without these rakes to windrow beans farmers were obliged to perform the job with hand labor. If sufficient machine cannot be made available the need could be adequately met by allocating several rakes to the county for use on a community basis.

Harvesting pools: In areas far from market there is need for a plan whereby growers with small acreages of beans could pool production for transportation to a processing plant. This could be facilitated by establishing a receiving center in a nearby town where a farmer could bring his crop to be delivered in a common load. The cost of transportation to the processing plant would be prorated, thus enabling a long expensive haul for the individual. The purchase of tractor-van beans by county agricultural conservation committees, as announced with the 1961 price program, would meet this need.

Production loans and risk insurance: A combination of the ACC macroscopic production loan program or a substitute plan would undoubtedly assist in a distinting bean production, especially on dry-land in 1962. A more inclusive program governing cost of production with an allowance for land charges would appeal to a number of farmers because abandonment of the bean crop usually comes too late in the season to allow planting a much crop on the land.

The need for some type of risk protection to cover bean production was indicated by about one-third of the growers interviewed. The ACC loan was used in 1961 more in the dry-land areas by growers having large acreages but most of the growers in the area were not exposed to such a program.

Those farmers insuring a bean for risk insurance did not indicate a particular plan. The ACC macroscopic loan offered in 1962 on wheat crops, as beans, may well lend by the majority of users. Those loans appealed to the growers as protection against crop failure rather than as a means of financing the crop. A minor criticism was the involved procedure necessary in obtaining the loan and also that loans were made to operators who did not make the necessary effort to care for the crop.

Dissemination of information: Although the Extension Service and other agencies have contributed to farmers in producing beans in 1962, a continuation of this effort in 1964 is necessary. Farmers in new bean-producing areas need additional information on combined production, the amount to seed per acre, weed control, best harvesting methods, ways to keep losses from shattering, and harvesting practices that result in minimum loss from injuring. Many new growers have learned some of these practices the hard way. But additional information on proven practices will enable them and other new growers in producing more beans at a lower cost in 1964.